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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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21140	7590	04/20/2005	EXAMINER	
GREGORY L BRADLEY MEDRAD INC ONE MEDRAD DRIVE INDIANOLA, PA 15051			FETZNER, TIFFANY A	
			ART UNIT	PAPER NUMBER
			2859	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/723,428	MONSKI ET AL.	
	Examiner	Art Unit	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 99-173 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 99-173 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/27/2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because:
 - A) Amended Figures 2A and 2B submitted January 10th 2005 are not described in the brief description of drawings or the detailed description of drawings. The examiner suggests referring to figures 2, 2A, and 2B; on page 12 in paragraph [32], and on page 14 in paragraph [53].
 - B) In **Figures 1a and 1c component 6 is not described** in the paragraphs which detail the description of figures 1A and 1c (i.e., page 1 paragraph [05] through page 4 paragraph [09]. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The official draftsman has objected to the drawings submitted on January 10th 2005, and November 27th 2003. See the attached PTO 948 Notice of Official draftsman Review attached to this office action.

Specification

3. The disclosure is objected to because of the following informalities: Figures 2A and 2B are not referred to, and component 6 of figures 1A and 1C is not described. [See the drawing objections above. Appropriate correction is required.

Claim Objections

4. **Claim 99** is objected to because of the following informalities: In (new) **claim 99** limitation (c) line 6 **after** "while" **insert** "performing" so that the "at least one of" limitation makes grammatical sense. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 99, 100, 109, 111-124, 133, 135-137, 139-146, 156, 158-160, 162-167, and 169-171**, are rejected under **35 U.S.C. 102(b)** as being anticipated by **Srinivasan et al.**, US patent 5,602,479 issued February 11th 1997.

7. With respect to **Claim 99**, **Srinivasan et al.**, teaches and shows "A head coil for use with a magnetic resonance (MR) system capable of acquiring images of a region of interest using parallel imaging techniques;" [See **Srinivasan et al.**, figures 1-11, col. 1 line 6 through col. 8 line 35, and the abstract] "the head coil comprising: (a) a first ring at an inferior end of the head coil" (i.e. ring component 80, 120), "said first ring being electrically conductive and having a first diameter through which the region of interest is provided access to the head coil;" [See **Srinivasan et al.**, figures 1, 2, 5 col. 3 lines 50-54; col. 4 line 15 through col. 6 line 5] "(b) a second ring at a superior end of the head coil", [See **Srinivasan et al.**, figures 9, 11, 6, 7 for second annular ring 114, or circular electrode 84 of figure 2] "said second ring being electrically conductive and having a second diameter smaller than said first diameter of said first ring;" [See **Srinivasan et al.**, figure 2 where circular electrode 84 is of a smaller diameter than the first inferior ring 80 of figure 2; and the teaching of col. 7 line 58 through col. 8 line 7 where having the two rings be of different diameters is explicitly taught] "and (c) a plurality of rods" (i.e. leg components 82) "electrically interconnecting said first and said second rings to form a birdcage-like structure therewith", [See **Srinivasan et al.**, figures 1, 2, 6, 7, 9, 10, 11; abstract, col. 1 line 23 through col. 2 line 4; col. 3 lines 7-8; col. 4 line 13 through col. 8

line 35.], each of said rods having a linear portion and a tapered portion with said linear portion being connected to said first ring and said tapered portion being connected to said second ring, said tapered portions of said rods collectively providing the head coil with a substantially homogeneous pattern of magnetic flux density in at least one of three orthogonal imaging planes of the head coil while performing at least one of maintaining and improving a signal-to-noise ratio of the head coil;" [See **Srinivasan et al.**, abstract, figures 1-11 especially figure 8, col. 2 line 26 through col. 8 line 35] "wherein said rods and said first and said second rings are configured to produce about the birdcage-like structure a plurality of partially-overlapped primary resonant substructures" [See **Srinivasan et al.**, figure 10, col. 7 line 64 through col. 8 line 25] "with each of said primary resonant sub-structures including two of said rods and a corresponding section of each of said first and said second rings interconnecting them" [See **Srinivasan et al.**, figures 2, 6, 7], which are capable of being used by the MR system for simultaneous reception of magnetic resonance signals from the region of interest" [See **Srinivasan et al.**, figure 1 and col. 7 line 64 through col. 8 line 25 where the teaching of using the hybrid different diameter coils in "concert" (i.e. together) col. 8 line 6, for a receive-only, mode col. 8 line 24, is a direct teaching that the overlapped coils receive MR signals: together / at the same time / in synch with one another / simultaneously.]

8. With respect to **Claim 117**, **Srinivasan et al.**, teaches and shows "A coil for use with a magnetic resonance (MR) system, the coil comprising: (a) a first ring at one end of the coil, said first ring being electrically conductive and having a first diameter;" [See **Srinivasan et al.**, figures 1, 2, 5 col. 3 lines 50-54; col. 4 line 15 through col. 6 line 5] "(b) a second ring at an other end of the coil, said second ring being electrically conductive and having a second diameter;" [See **Srinivasan et al.**, figure 2 where circular electrode 84 is of a smaller diameter than the first ring 80 of figure 2; and the teaching of col. 7 line 58 through col. 8 line 7 where having the two rings be of different diameters is explicitly taught] "and (c) a plurality of rods" (i.e. leg components 82) "electrically interconnecting said first and said second rings to form a birdcage-like structure therewith;" [See **Srinivasan et al.**, figures 1, 2, 6, 7, 9, 10, 11; abstract, col. 1

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line 23 through col. 2 line 4; col. 3 lines 7-8; col. 4 line 13 through col. 8 line 35.]

“wherein said rods and said first and said second rings are configured to produce a plurality of partially overlapped primary resonant substructures about the birdcage-like structure” [See **Srinivasan et al.**, figure 10, col. 7 line 64 through col. 8 line 25], “with each of said primary resonant sub structures including two of said rods and a corresponding section of each of said first and said second rings interconnecting them.” [See **Srinivasan et al.**, figures 2, 6, 7]. The same reasons for rejection, that apply to **claim 99** also apply to **claim 117** and need not be reiterated.

9. With respect to **Claim 140**, **Srinivasan et al.**, teaches and shows “A coil for use with a magnetic resonance (MR) system,” [See **Srinivasan et al.**, figure 1, col. 3 line 27 through col. 4 line 12; col. 1 line 6 through col. 2 line 23] “the coil comprising: (a) a pair of electrically conductive rings” [See **Srinivasan et al.**, figures 1, 2, 5, 6, 7, 9, 10, 11; abstract, col. 3 line 27 through col. 8 line 35], “each of said rings being disposed approximately at an opposite end of the coil from the other,” [See **Srinivasan et al.**, figures 1, 2, 5, 6, 7, 9, 10, 11]; and (b) a plurality of rods” (i.e. legs) “electrically interconnecting said rings to form a birdcage-like structure therewith,” [See **Srinivasan et al.**, figures 1, 2, 6, 7, 9, 10, 11; abstract, col. 1 line 23 through col. 2 line 4; col. 3 lines 7-8; col. 4 line 13 through col. 8 line 35.] “wherein said rods and said rings are configured to produce a plurality of partially overlapped primary resonant substructures about the birdcage-like structure” [See **Srinivasan et al.**, figure 10, col. 7 line 64 through col. 8 line 25], “with each of said primary resonant sub structures including two of said rods and a corresponding section of each of said rings interconnecting them.” [See **Srinivasan et al.**, figures 2, 6, 7]. The same reasons for rejection, that apply to **claims 99, 117** also apply to **claim 140** and need not be reiterated.

10. With respect to **Claim 163**, **Srinivasan et al.**, teaches and shows “A coil for use with a magnetic resonance (MR) system,” [See **Srinivasan et al.**, figure 1, col. 3 line 27 through col. 4 line 12; col. 1 line 6 through col. 2 line 23] “the coil comprising: (a) a first end member” (i.e. a conductive ring / loop) “approximate one end of the coil, said first end member being electrically conductive;” [See **Srinivasan et al.**, figures 1, 2, 5, 6, 7, 9, 10, 11; components 80, 114, abstract, col. 3 line 27 through col. 8 line 35], (b) a

second end member" (i.e. a second conductive ring / loop) "approximate an other end of the coil, said second end member being electrically conductive;" [See **Srinivasan et al.**, figures 1, 2, 5, 6, 7, 9, 10, 11; components 84, 120, abstract, col. 3 line 27 through col. 8 line 35], "and (c) a plurality of rods electrically interconnecting said first and said second end members;" ;" [See **Srinivasan et al.**, figures 1, 2, 6, 7, 9, 10, 11; abstract, col. 1 line 23 through col. 2 line 4; col. 3 lines 7-8; col. 4 line 13 through col. 8 line 35.] "wherein said rods and said first and said second end members are configured to yield a plurality of partially overlapped primary resonant substructures [See **Srinivasan et al.**, figure 10, col. 7 line 64 through col. 8 line 25], "with each of said primary resonant substructures including two of said rods and a corresponding section of each of said first and said second end members interconnecting them." [See **Srinivasan et al.**, figures 2, 6, 7]. The same reasons for rejection, that apply to **claims 99, 117, 140** also apply to **claim 160** and need not be reiterated.

11. With respect to corresponding **Claims 100, 124, 147, Srinivasan et al.**, shows that "said plurality of partially-overlapped primary resonant substructures are deployed generally symmetrically about the birdcage-like structure." [See figure 10]. The same reasons for rejection, that apply to **claims 99, 117, 140** also apply to **claims 100, 124, 147** and need not be reiterated.

12. With respect to corresponding **Claims 109, 133, 156, 167, Srinivasan et al.**, teaches that "the head coil is a receive-only coil." [See **Srinivasan et al.**, col. 8 lines 23-25; col. 6 lines 13-15] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claims 109, 133, 156, 167** and need not be reiterated.

13. With respect to **Claims 111, Srinivasan et al.**, teaches and shows that "each of said rods and said first and said second rings contain therein a plurality of reactive electrical components". [See the capacitors and inductors of figures 2, 3, 4, 6, and 7; col. 4 line 35 through col. 8 line 16] The same reasons for rejection, that apply to **claim 99** also apply to **claim 111** and need not be reiterated.

14. With respect to corresponding **Claims 112, 135, 158, 169, Srinivasan et al.**, shows that "each of said primary resonant substructures includes a port connector in said corresponding section of said second ring thereof for connection to a (i.e. **claim**

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112) / one (i.e. **claims 135, 158, 169**) channel of the MR system." [See figures 1, 2, 3, 4; col. 3 line 55 through col. 5 line 63; especially col. 5 lines 7-29 where all the MR signals exit at a single virtual ground.] The same reasons for rejection, that apply to **claim 99** also apply to **claims 112, 135, 158, 169** and need not be reiterated.

15. With respect to corresponding **Claims 113, 136, 159, 170, Srinivasan et al.**, teaches that "the head coil is configured as one of a low pass coil, a high pass coil and a band pass coil." [See **Srinivasan et al.**, col. 6 lines 32-36; col. 7 lines 39-41.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claims 113, 136, 159, 170** and need not be reiterated.

16. With respect to corresponding **Claims 114, 122, 145, Srinivasan et al.**, shows that "said first and said second rings are circular. [See **Srinivasan et al.**, figures 2, 6, 7; also see the teachings of col. 7 line 58 through col. 8 line 13, which teach that the shape of the coils may include other shapes, different from the circular rings shown in the figures.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claims 114, 122, 145**, and need not be reiterated.

17. With respect to corresponding **Claims 115, 123, 146, Srinivasan et al.**, teaches that "at least one of said first and said second rings are elliptical". [See **Srinivasan et al.**, col. 7 line 58 through col. 8 line 13, which teach that the shape of the coils may include elliptical or other shaped coil rings, different from the circular rings shown in the figures.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claims 115, 123, 146**, and need not be reiterated.

18. With respect to corresponding **Claims 116, 137, 160, Srinivasan et al.**, shows from figure 10 that "said first ring and said second ring (i.e. components 80, 114, 120) "are each larger in diameter than a center of the head coil", because the center of the head coil configuration of figure 10 has a smaller diameter due to the reduction of the diameter at the center than the normal diameter of the ring components 80, 114, 120. Additionally, **Srinivasan et al.**, also teaches that the individual coils may have different diameters. [See **Srinivasan et al.**, col. 7 line 58 through col. 8 line 13; col. 5 line 64 through col. 6 line 16.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claims 116, 137, 160**, and need not be reiterated.

19. With respect to **Claim 118, Srinivasan et al.**, teaches and shows that "said second diameter of said second ring is smaller than said first diameter of said first ring". [See **Srinivasan et al.**, figure 2 where circular electrode 84 is of a smaller diameter than the diameter of the first ring 80 of figure 2; and the teaching of col. 7 line 58 through col. 8 line 7 where having the two rings be of different diameters is explicitly taught] The same reasons for rejection, that apply to **claims 99, 117**, also apply to **claim 118**, and need not be reiterated.

20. With respect to corresponding **Claims 119, 142, Srinivasan et al.**, teaches and shows that "each of said rods has a linear portion and a tapered portion with said linear portion being connected to said first ring and said tapered portion being connected to said second ring." [See **Srinivasan et al.**, abstract, figures 1, 2, 5, 6, 10, and 11, col. 2 line 26 through col. 8 line 35] The same reasons for rejection, that apply to **claims 99, 117, 118, 140, 141** also apply to **claims 119, 142**, and need not be reiterated.

21. With respect to corresponding **Claims 120, 143, Srinivasan et al.**, teaches and shows that "said tapered portion of each of said rods comprises at least one angled linear segmented section. [See **Srinivasan et al.**, abstract, figures 1, 2, 5, 6, 10, and 11, col. 2 line 26 through col. 8 line 35] The same reasons for rejection, that apply to **claims 99, 117, 118, 119, 140, 141, 142** also apply to **claims 120, 143**, and need not be reiterated.

22. With respect to corresponding **Claims 121, 144, Srinivasan et al.**, shows in figures 6 and 11 that "said first and said second diameters of said first" (i.e. component 114) "and said second" (i.e. component 120) "rings, respectively, are equal". [See **Srinivasan et al.**, figures 6, 11 components 114, 120; and the teaching of col. 7 line 58 through col. 8 line 7 where having the two rings be of same or different diameters is explicitly taught] The same reasons for rejection, that apply to **claims 99, 117, 140**, also apply to **claims 121, 144**, and need not be reiterated.

23. With respect to corresponding **Claims 139, 162, 171, Srinivasan et al.**, teaches and shows that "each of said primary resonant substructures is used to receive magnetic resonance signals from tissue within its field of view for conveyance to one channel of the MR system during a receive cycle thereof. [See **Srinivasan et al.**, figures

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1, 2, 3, and 4 in combination; and the teaching of col. 7 line 58 through col. 8 line 25, where in the receive only mode the signals from the tissue(s) within the coil are sent to receiver 66 of figure 1.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163**, also apply to **claims 139, 162, 171**, and need not be reiterated.

24. With respect to **Claim 141, Srinivasan et al.**, teaches and shows that "a first of said rings has a first diameter" (i.e. See ring components (80, 114, 120) "and a second of said rings" (i.e. component 84, in figure 2, or component 114 in figure 6) "has a second diameter, with said second diameter being smaller than said first diameter."

[See **Srinivasan et al.**, figures 2, 6 where circular electrode 84 is of a smaller diameter than the diameter of the first ring 80 of figure 2; See figure 6 where ring 114 is smaller than ring 120; and the teaching of col. 7 line 58 through col. 8 line 7 where having the two rings be of different diameters is explicitly taught] The same reasons for rejection, that apply to **claims 99, 117**, also apply to **claim 118**, and need not be reiterated.

25. With respect to **Claim 164, Srinivasan et al.**, teaches and shows that "(a) said first and said second end members are rings;" [See **Srinivasan et al.**, figures 2, 6, 7, 10, 11, abstract, and col. 1 line 6 through col. 8 line 25 in general.] "(b) said rods" (i.e. leg components 82) "and said first and said second end members are interconnected to form a birdcage-like structure with said plurality of partially-overlapped primary resonant substructures deployed thereabout." [See **Srinivasan et al.**, figures 2, 6, 7, 10; col. 7 line 64 through col. 8 line 25 and the text of the entire reference in general.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claim 164**, and need not be reiterated.

26. With respect to **Claim 165, Srinivasan et al.**, shows that "said rods" (i.e. leg components 82) "and said first and said second end members are interconnected to form an open-sided birdcage-like structure with said plurality of partially overlapped primary resonant substructures deployed thereabout. [See **Srinivasan et al.**, figures 2, 6, 7, 10; col. 7 line 64 through col. 8 line 25 and the text of the entire reference in general.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claim 165**, and need not be reiterated.

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27. With respect to **Claim 166, Srinivasan et al.**, teaches that "said rods" (i.e. leg components 82) "and said first and said second end members are interconnected to form a surface coil-like structure with said plurality of partially overlapped primary resonant substructures deployed there along." [See **Srinivasan et al.**, col. 7 line 58 through col. 8 line 25 where the ability to use flat, surface coils in an array is taught as being included as part of the **Srinivasan et al.**, invention.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claim 166**, and need not be reiterated.

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

29. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

30. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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31. **Claims 101-108, 110, 125-32, 134, 138, 148-155, 157, 161, 168 and 172-173** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Srinivasan et al.**, US patent 5,602,479 issued February 11th 1997.

32. With respect to corresponding **Claims 101, 125, 148, Srinivasan et al.**, lacks directly stating, but does suggest that "said plurality of partially-overlapped primary resonant substructures" may be "three in number, with each being generally deployed 120 degrees apart", because **Srinivasan et al.**, teaches coil arrangements which maintain, and coil arrangements which lack symmetry. [See col. 6 lines 2-5; and that 'the coil arrangement's shape including coil diameter, coil length, ratio of the straight elements to the dome length, and the number of legs', in hybrid or symmetrical configurations 'are all designed degrees of freedom which may be varied to optimize the coil for a particular application'. [See figure 10 in combination with col. 7 line 58 through col. 8 line 35. Additionally, the examiner notes that conventionally rings inherently possess 360 degrees, and since **Srinivasan et al.**, teaches both features that: the number of legs is adjustable and that the legs may have a symmetrical distribution (i.e. as evidenced by figures 1-11 of **Srinivasan et al.**), it would have been obvious to one of ordinary skill in the art at the time that the invention was made that a symmetrically overlapped configuration optimally possessing three legs would automatically and intrinsically have the overlapped legs positioned 120 degrees apart, since $360 \div 3 = 120$ degrees. Therefore, applicant's dependent limitation is directly suggested and taught by the variations of the invention disclosed by the **Srinivasan et al.**, reference.] The same reasons for rejection, that apply to **claims 99, 117, 140** also apply to **claims 101, 125, 148** and need not be reiterated.

33. With respect to corresponding **Claims 102, 126, 149, Srinivasan et al.**, lacks directly stating, but does suggest that "selected ones of said rods are spaced at irregular distances from adjacent ones of said rods" because **Srinivasan et al.**, teaches that the coil configurations taught may have a "no-fold" symmetry (i.e. the legs may be irregularly located). [See col. 6 lines 2-5, col. 7 line 64 through col. 8 line 25, and figure 10] The same reasons for rejection, that apply to **claims 99, 101, 117, 125, 140, 148** also apply to **claims 102, 126, 149** and need not be reiterated.

34. With respect to corresponding **Claims 103, 127, 150, Srinivasan et al.**, lacks directly stating, but does suggest that "said plurality of partially-overlapped primary resonant substructures" is four in number, with each being generally deployed 90 degrees apart" because **Srinivasan et al.**, teaches coil arrangements which maintain a two-fold symmetry, a four-fold symmetry, and coil arrangements with a no-fold symmetry. [See col. 6 lines 2-5] The examiner notes that symmetry along two axial folds such as "x" and "y", suggests at least four substructures 90 degrees apart. Additionally, **Srinivasan et al.**, teaches that 'the coil arrangement's shape including coil diameter, coil length, ratio of the straight elements to the dome length, and the number of legs', in hybrid or symmetrical configurations 'are all designed degrees of freedom which may be varied to optimize the coil for a particular application'. [See figure 10 in combination with col. 7 line 58 through col. 8 line 35. The examiner also notes that conventionally rings inherently possess 360 degrees, and since **Srinivasan et al.**, teaches both features that: the number of legs is adjustable and that the legs may have a symmetrical distribution (i.e. as evidenced by figures 1-11 of **Srinivasan et al.**,) It would have been obvious to one of ordinary skill in the art at the time that the invention was made that a symmetrically overlapped configuration optimally possessing four legs would automatically and intrinsically have the partially overlapped legs positioned 90 degrees apart, since $360 \text{ divided by } 4 = 90 \text{ degrees}$. Therefore, applicant's dependent limitation is directly suggested and taught by the variations of the invention disclosed by the **Srinivasan et al.**; reference.] The same reasons for rejection, that apply to **claims 99, 117, 140**, also apply to **claims 103, 127, 150** and need not be reiterated.

35. With respect to corresponding **Claims 104, 128, 151, Srinivasan et al.**, lacks directly stating, but does suggest that "selected ones of said rods are spaced at irregular distances from adjacent ones of said rods." because **Srinivasan et al.**, teaches that the coil configurations taught may have a "no-fold" symmetry (i.e. the legs may be irregularly located). [See col. 6 lines 2-5, col. 7 line 64 through col. 8 line 25, and figure 10] The same reasons for rejection, that apply to **claim 99, 103, 117, 127, 140, 150**, also apply to **claims 104, 128, 151** and need not be reiterated.

36. With respect to corresponding **Claims 105, 129, 152, Srinivasan et al.**, lacks directly stating, but does suggest that "said plurality of partially-overlapped primary resonant substructures is six in number, with each being generally deployed 60 degrees apart" because, **Srinivasan et al.**, teaches coil arrangements which maintain symmetry, and coil arrangements with a no-fold symmetry. [See col. 6 lines 2-5] Additionally, **Srinivasan et al.**, teaches that 'the coil arrangement's shape including coil diameter, coil length, ratio of the straight elements to the dome length, and the number of legs', in hybrid or symmetrical configurations 'are all designed degrees of freedom which may be varied to optimize the coil for a particular application'. [See figure 10 in combination with col. 7 line 58 through col. 8 line 35. The examiner also notes that conventionally rings inherently possess 360 degrees, and since **Srinivasan et al.**, teaches both features that: the number of legs is adjustable and that the legs may have a symmetrical distribution (i.e. as evidenced by figures 1-11 of **Srinivasan et al.**,) It would have been obvious to one of ordinary skill in the art at the time that the invention was made that a symmetrically overlapped configuration optimally possessing six legs would automatically and intrinsically have the partially overlapped legs positioned 60 degrees apart, since $360 \text{ divided by } 6 = 60 \text{ degrees}$. Therefore, applicant's dependent limitation is directly suggested taught by the variations of the invention disclosed by the **Srinivasan et al.**, reference.] The same reasons for rejection, that apply to **claims 99, 117, 140**, also apply to **claims 105, 129, 152** and need not be reiterated.

37. With respect to corresponding **Claims 106, 130, 153 Srinivasan et al.**, lacks directly stating, but does suggest that "selected ones of said rods are spaced at irregular distances from adjacent ones of said rods" because **Srinivasan et al.**, teaches that the coil configurations taught may have a "no-fold" symmetry (i.e. the legs may be irregularly located). [See col. 6 lines 2-5, col. 7 line 64 through col. 8 line 25, and figure 10] The same reasons for rejection, that apply to **claim 99, 105, 117, 129, 140, 152** also apply to **claims 106, 130, 153** and need not be reiterated.

38. With respect to corresponding **Claims 107, 131, 154, Srinivasan et al.**, lacks directly stating, but does suggest that "selected ones of said rods are spaced at irregular distances from adjacent ones of said rods", because **Srinivasan et al.**,

teaches that the coil configurations taught may have a "no-fold" symmetry therefore the legs of **Srinivasan et al.**, may be irregularly located). [See col. 6 lines 2-5, col. 7 line 64 through col. 8 line 25, and figure 10]. The same reasons for rejection, that apply to **claims 99, 117, 140**, also apply to **claims 107, 131, 154** and need not be reiterated.

39. With respect to corresponding **Claims 108, 132, 155, Srinivasan et al.**, lacks directly stating, but does suggest that "(a) said plurality of rods is eight in number", because **Srinivasan et al.**, teaches coil arrangements which maintain a two-fold symmetry, a four-fold symmetry, and coil arrangements with a no-fold symmetry. [See col. 6 lines 2-5] The examiner notes that symmetry along four axial folds, suggests at least eight substructures 45 degrees apart. Additionally, **Srinivasan et al.**, teaches that 'the coil arrangement's shape including coil diameter, coil length, ratio of the straight elements to the dome length, and the number of legs', in hybrid or symmetrical configurations 'are all designed degrees of freedom which may be varied to optimize the coil for a particular application'. [See figure 10 in combination with col. 7 line 58 through col. 8 line 35. The examiner also notes that conventionally rings inherently possess 360 degrees, and since **Srinivasan et al.**, teaches both features that: the number of legs is adjustable and that the legs may have a symmetrical distribution (i.e. as evidenced by figures 1-11 of **Srinivasan et al.**,) It would have been obvious to one of ordinary skill in the art at the time that the invention was made that a symmetrically overlapped configuration optimally possessing four legs would automatically and intrinsically have the partially overlapped legs positioned 45 degrees apart, since $360 \text{ divided by } 8 = 45 \text{ degrees}$.

40. **Srinivasan et al.**, also lacks directly stating, but does suggest that "selected ones of said rods are spaced at irregular distances from adjacent ones of said rods;" because **Srinivasan et al.**, teaches that the coil configurations taught may have a "no-fold" symmetry (i.e. the legs may be irregularly located). [See **Srinivasan et al.**, col. 6 lines 2-5, col. 7 line 64 through col. 8 line 25, and figure 10] **Srinivasan et al.**, also lacks directly stating, but does suggest limitation (b) that "said partially-overlapped primary resonant substructures is four in number, with each being generally deployed 90 degrees apart" because **Srinivasan et al.**, teaches that the coil configurations taught

may have a “no-fold” a “two-fold” or a “four-fold” symmetry with 90 degree displaced legs). [See col. 6 lines 2-5, col. 5 line 5, col. 7 line 64 through col. 8 line 25, and figure 10] The same reasons for rejection, that apply to **claims 99, 117, 140**, also apply to **claims 108, 132, 155** and need not be reiterated.

41. With respect to corresponding **Claims 138, 161, Srinivasan et al.**, lacks directly stating, but does suggest that “said first ring and said second ring” may each be “smaller in diameter than a center of the coil”, because **Srinivasan et al.**, teaches that ‘the coil arrangement’s shape including coil diameter, coil length, ratio of the straight elements to the dome length, and the number of legs’, in hybrid or symmetrical configurations ‘are all designed degrees of freedom which may be varied to optimize the coil for a particular application’. [See **Srinivasan et al.**, figure 10 in combination with col. 7 line 58 through col. 8 line 35.col. 5 line 53 through col. 6 line 16].] The same reasons for rejection, that apply to **claims 99, 117, 140**, also apply to **claims 138, 161**, and need not be reiterated.

42. With respect to corresponding **Claims 110, 134, 157, 168, Srinivasan et al.**, lacks directly stating, the terms “decoupling” or “decoupling network” but does suggest limitation “(a)” because “each of said primary resonant substructures” (i.e. ring components 80, 84, 114, 120) shown in figures 1, 2, 6, 7, 10 and 11, but primarily shown in figure 2 “includes an” intrinsic “active decoupling network in said corresponding section of said second ring thereof” (i.e. the plurality of the capacitors which are placed within in the end ring components actively decouple the ring components and are considered to be an active decoupling network of components within the birdcage coil structure by the examiner. [See figure 2, this feature is taught in col. 4 lines 35-50, and col. 6 lines 28-42]). Additionally, **Srinivasan et al.**, shows that “(b) each of said rods includes a passive decoupling network therein” [See figures 2, 3, 4 col. 3 line 27 through col. 5 line 63, where the inductive, capacitive, cable shielding, and the common virtual ground connected to or found within the legs / rods function to “passively decouple” the MR signals, even though the actual term of “passive decoupling is lacked by the reference. Therefore, It would have been obvious to one of ordinary skill in the art at the time that the invention was made that the configuration

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shown and taught by **Srinivasan et al.**, meets the passive and active decoupling requirements, stated by applicant. The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claims 110, 134, 157, 158**, and need not be reiterated.

43. With respect to corresponding **Claims 172 Srinivasan et al.**, lacks directly stating that the MRI bird cage coil array is a "neurovascular array" However in col. 2 lines 9-19 **Srinivasan et al.**, teaches that modified birdcage coils are used to image smaller vessels (i.e. blood vessels) where the focus is more toward the top of the brain. Therefore It would have been obvious to one of ordinary skill in the art at the time that the invention was made that because the MRI RF birdcage coil is capable of imaging vessels (i.e. blood vessels) that the birdcage coil of **Srinivasan et al.**, is a "neurovascular array for use with a magnetic resonance (MR) system;" wherein "the Neurovascular array" as taught by **Srinivasan et al.**, comprises: "(a) a head coil including: (I) a first ring approximate one end of the head coil, said first ring being electrically conductive and having a first diameter, (II) a second ring approximate an other end of the head coil, said second ring being electrically conductive and having a second diameter, and (III) a plurality of rods electrically interconnecting said first and said second rings to form a birdcage-like structure therewith, wherein said rods and said first and said second rings are configured to produce a plurality of partially overlapped primary resonant substructures about the birdcage-like structure, with each of said primary resonant substructures constituting a coil element having two of said rods and a corresponding section of each of said first and said second rings interconnecting them;" for the same reasons as those already provided in the rejection of **claim 99** which need not be reiterated.

44. **Srinivasan et al.**, also teaches limitation "(b) an anterior neck coil including at least one coil element; and (c) a posterior cervical spine coil including at least one coil element" from the teachings col. 8 lines 8-13 where head and neck imaging including imaging the posterior side of the neck, [See figure 11] are taught and shown. [See also figure 5 and col. 5 line 64 through col. 6 line 16.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163** also apply to **claim 172**, and need not be reiterated.

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45. With respect to **Claim 173, Srinivasan et al.**, teaches and shows that "at least one of said coil elements of said anterior neck coil and said posterior cervical spine coil" [See **Srinivasan et al.**, figures 5, 11; col. 5 line 64 through col. 6 line 16; col. 8 lines 8-13] "partially overlaps said head coil at an inferior end thereof." [See **Srinivasan et al.**, figures 5, 11; col. 5 line 64 through col. 6 line 16; col. 7 line 58- through col. 8 line 25.] The same reasons for rejection, that apply to **claims 99, 117, 140, 163, 172** also apply to **claim. 173**, and need not be reiterated.

Prior art of Record

46. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A) **Srinivasan et al.**, US patent 5,664,568 issued September 9th 1997.

B) **Reisker et al.**, US patent 6,344,745 issued Feb. 5th 2002, filed November 24th 1999, with an effective US priority date of November 25th 1998.


C) **Reisker et al.**, US patent Application Publication 2003/0071622 A1 published April 17th, 2003, filed February 5th 2002, which is a continuation of **Reisker et al.**, US patent 6,344,745 and has an effective US priority date of November 24th 1999.

D) **Reisker et al.**, US patent 6,831,460 B2 issued December 14th 2004 filed February 5th 2002, which corresponds to: **Reisker et al.**, US patent Application Publication 2003/0071622 A1 published April 17th, 2003, which is a continuation of **Reisker et al.**, US patent 6,344,745 and has an effective US priority date of November 24th 1999.

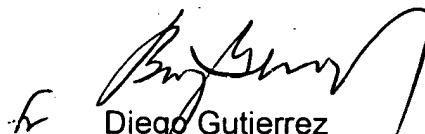
Conclusion

47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

48. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.



TAF
April 16, 2005



Diego Gutierrez
Supervisory Patent Examiner
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